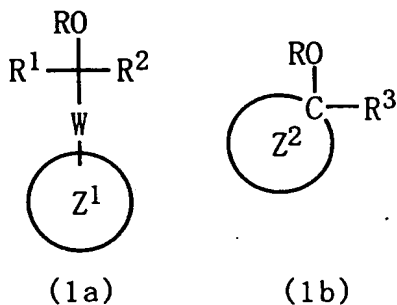
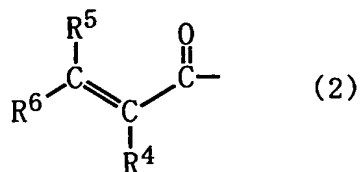


CLAIMS

1. A fluorine-atom-containing polymerizable
unsaturated-monomer represented by the following formula (1a)
5 or (1b):



wherein each of a ring Z^1 and a ring Z^2 is an alicyclic carbon
ring; when the alicyclic carbon ring is multi-cyclic, a part
of atoms constituting the ring may be substituted by an oxygen
atom, a sulfur atom or a nitrogen atom; an atom constituting
10 the ring Z^1 or the ring Z^2 may have a substituent; each of R^1 , R^2
and R^3 is an alkyl group or a fluoroalkyl group; W denotes a
single bond or a combining group and R is an unsaturated acyl
group represented by the following formula (2):



15 wherein each of R^4 , R^5 and R^6 is a hydrogen atom, a fluorine
atom, an alkyl group or a fluoroalkyl group; a carbon atom
bonded by at least one hydrogen atom exists in an adjacent

position to the carbon atom bonded by an RO- group represented by the formula (1a) and the formula (1b); provided that at least one of R^1 , R^2 , R^4 , R^5 and R^6 is a fluorine atom or a fluoroalkyl group in the formula (1a), and in the formula (1b) (i) the ring Z^2 is bonded by a fluorine atom or a fluoroalkyl group, or (ii) R^3 is a fluoroalkyl group.

2. A fluorine-atom-containing polymerizable unsaturated-monomer according to Claim 1, wherein neither of adjacent carbon atoms to the carbon atom bonded by an RO- group has a fluorine atom in the formula (1a) or the formula (1b).

3. A fluorine-atom-containing polymerizable unsaturated-monomer according to Claim 1 or Claim 2, wherein, in the formula (1a),

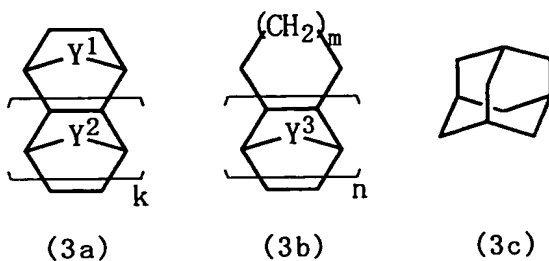
(i) the ring Z^1 is bonded by a fluorine atom or a fluoroalkyl group;

(ii) at least one of R^1 and R^2 is a fluoroalkyl group having a hydrogen atom at 1st position;

(iii) both of R^1 and R^2 are alkyl groups which have a hydrogen atom at 1st position and may be fluorinated; or

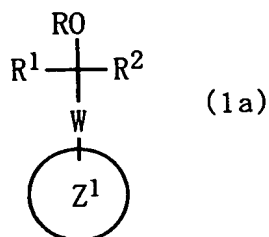
(iv) at least one of R^1 and R^2 is an alkyl group of which a carbon number is three or more and may be fluorinated.

4. A fluorine-atom-containing polymerizable unsaturated-monomer according to any one of claims 1 to 3, wherein the ring Z^1 or the ring Z^2 is a ring represented by the following formula (3a), (3b) or (3c);

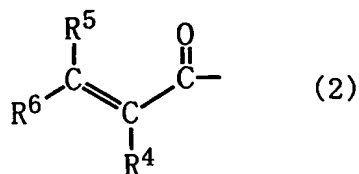


wherein Y^1 is an alkylene group, an oxygen atom or a sulfur atom, each of Y^2 and Y^3 is an alkylene group, an oxygen atom, a sulfur atom or non bonding, each of k and n denotes an integer of 0 to 3, m denotes 1 or 2, and an atom constituting the rings in the formulae may have a substituent.

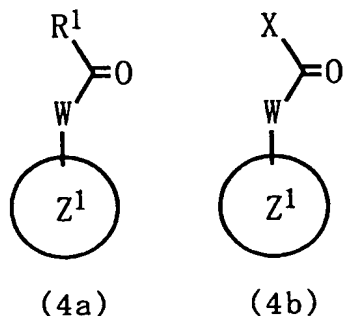
5. A process for producing a fluorine-atom-containing polymerizable unsaturated-monomer wherein a compound represented by the following formula (1a):



wherein each of the ring Z^1 is an alicyclic carbon ring, R^1 is an alkyl group or a fluoroalkyl group, R^2 is an alkyl group or a fluoroalkyl group, R is an unsaturated acyl group represented by the following formula (2):



wherein each of R^4 , R^5 and R^6 is a hydrogen atom, a fluorine atom, an alkyl group or a fluoroalkyl group; and W is the same as above; provided that, when a compound represented by the formula (4b) is used as a raw material, $R^1 = R^2$; and a carbon atom bonded by at least one hydrogen atom exists in an adjacent position to the carbon atom bonded by an RO- group; is obtained by allowing a compound represented by the following formula (4a) or (4b):



wherein a ring Z^1 is the same as above; when the alicyclic carbon ring is multi-cyclic, a part of atoms constituting the ring may be substituted by an oxygen atom, a sulfur atom or a nitrogen atom; an atom constituting the ring Z^1 may have a substituent; R^1 is the same as above; X is a halogen atom; W denotes a single bond or a combining group; to react with a (fluoro) alkylating agent represented by the following formula (5):



wherein R^2 is the same as above; M is a metal atom or a $-MgX^1$ group, wherein X^1 is a halogen atom; provided that a carbon

atom bonded by at least one hydrogen atom exists in a adjacent position to a carbonyl group in the above formula (4a) or (4b), or in 1st position of R^2 in the formula (5);

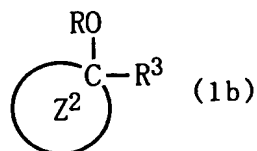
and allowing an acyl halide represented by the following

5 formula (6) to react to the obtained reaction product:

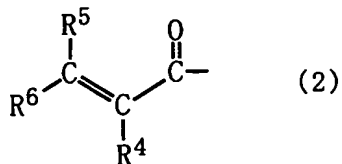


wherein R is the same as above; and X^2 is a halogen atom; provided that at least one of R^1 , R^2 , R^4 , R^5 and R^6 is a fluorine atom or a fluoroalkyl group.

10 6. A process for producing a fluorine-atom-containing polymerizable unsaturated-monomer wherein a compound represented by the following formula (1b):

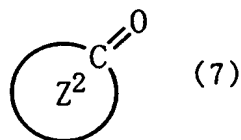


wherein the ring Z^2 is an alicyclic carbon ring; when the
15 alicyclic carbon ring is multi-cyclic, a part of atoms constituting the ring may be substituted by an oxygen atom, a sulfur atom or a nitrogen atom; an atom constituting the ring Z^2 may have a substituent, R^3 is an alkyl group or a fluoroalkyl group, and R is an unsaturated acyl group represented by the
20 following formula (2):

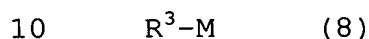


wherein each of R^4 , R^5 and R^6 is a hydrogen atom, a fluorine atom, an alkyl group or a fluoroalkyl group; and a carbon atom bonded by at least one hydrogen atom exists in an adjacent position to the carbon atom bonded by an $RO-$ group;

5 is obtained by allowing a carbonyl compound represented by the following formula (7):



wherein a ring Z^2 is the same as above, to react with a (fluoro) alkylating agent represented by the following formula (8):



wherein R^3 is the same as above; M is a metal atom or a $-MgX^1$ group, wherein X^1 is a halogen atom; provided that a carbon atom bonded by at least one hydrogen atom exists in a adjacent position to a carbonyl group in the above formula (7) or in
15 1st position of R^3 in the formula (8);

and allowing an acyl halide represented by the following formula (6) to react to the obtained reaction product:



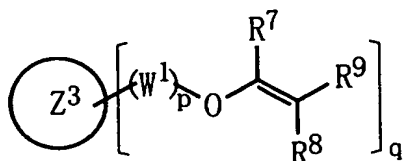
wherein R is the same as above; and X^2 is a halogen atom.

20 7. A polymeric compound having a repeated unit corresponding to a fluorine-atom-containing polymerizable unsaturated-monomer described in any one of claims 1 to 4.

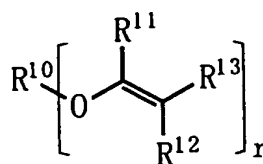
8. A polymeric compound according to Claim 7, wherein

a repeated unit having a substrate-adhesive function and/or a hydrophilic function is contained.

9. A polymeric compound according to Claim 7, wherein a repeated unit corresponding to a vinyl ether monomer represented by the following formula (9a) or (9b):

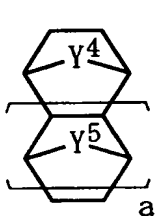


(9a)

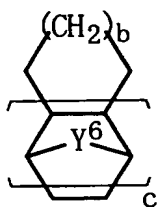


(9b)

wherein, in the formula (9a), the ring Z^3 is one of rings represented by the following formula (10a), (10b), (10c), (10d), (10e), (10f), (10g), (10h) or (10i):



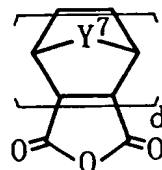
(10a)



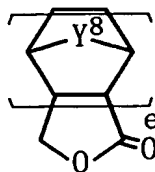
(10b)



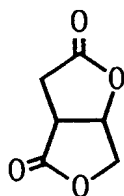
(10c)



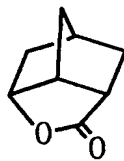
(10d)



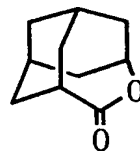
(10e)



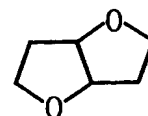
(10f)



(10g)



(10h)



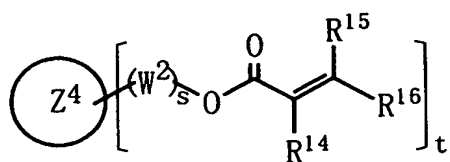
(10i)

10

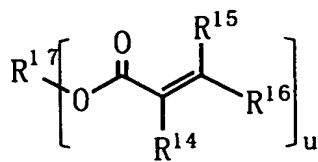
wherein Y^4 is an alkylene group, an oxygen atom or a sulfur atom; each of Y^5 , Y^6 , Y^7 and Y^8 is an alkylene group, an oxygen

atom, sulfur atom or non-bonding; each of a, c, d and e denotes an integer of 0 to 3; b denotes 1 or 2; and rings of the formulae may have a substituent; W^1 is a bivalent hydrocarbon group; each of R^7 , R^8 and R^9 is identical to or different from a hydrogen atom or an organic group; at least two of a ring Z^3 , W^1 , R^7 , R^8 and R^9 may be combined together to constitute a ring with one or two or more adjacent atoms; p denotes 0 or 1 and q denotes an integer 1 to 8; when q is 2 or more, each of groups in q pairs of brackets may be identical to or different from; in the formula (9b), R^{10} is an alkyl group which may have a substituent and each of R^{11} , R^{12} and R^{13} is identical to or different from a hydrogen atom or an organic group; at least two of R^{10} , R^{11} , R^{12} and R^{13} may be combined together to constitute a ring with one or two or more adjacent atoms; r denotes an integer of 1 to 8; when r is 2 or more, each of groups in r pairs of brackets may be identical to or different from; is contained.

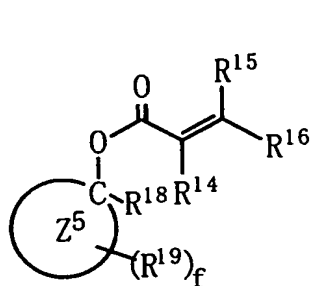
10. A polymeric compound according to Claim 7 or 9, wherein a repeated unit corresponding to an acryl monomer represented by the following formula (11a), (11b), (11c) or (11d):



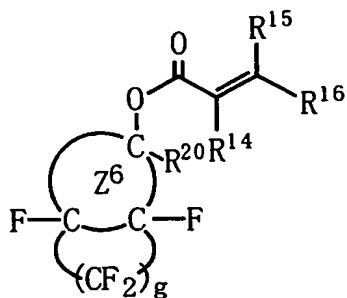
(11a)



(11b)

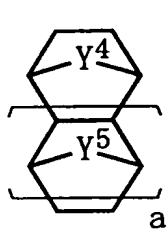


(11c)

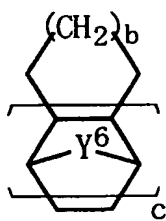


(11d)

wherein, in the formula (11a), the ring Z^4 is one of rings represented by the following formula (10a), (10b), (10c), (10d), (10e), (10f), (10g), (10h) or (10i):



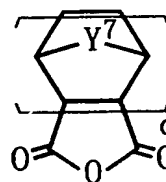
(10a)



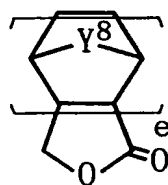
(10b)



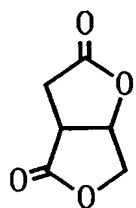
(10c)



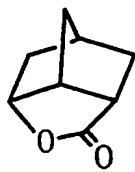
(10d)



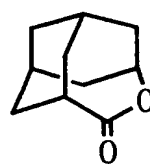
(10e)



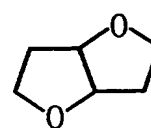
(10f)



(10g)



(10h)



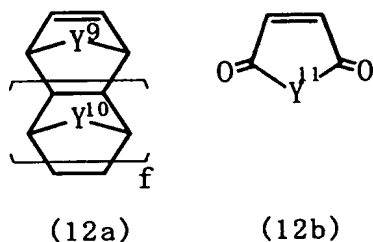
(10i)

wherein Y^4 is an alkylene group, an oxygen atom or a sulfur atom; each of Y^5 , Y^6 , Y^7 and Y^8 is an alkylene group, an oxygen atom, sulfur atom or non-bonding; each of a, c, d and e denotes an integer of 0 to 3; b denotes 1 or 2; and rings of the formulae
5 may have a substituent; W^2 is a bivalent hydrocarbon group; provided that each of Z^4 and W^2 does not have a fluorine atom or a fluoroalkyl group as a substituent; each of R^{14} , R^{15} and R^{16} is a hydrogen atom, a fluorine atom, an alkyl group or a fluoroalkyl group; s denotes 0 or 1 and t denotes an integer
10 of 1 to 8; when t is 2 or more, each of groups in t pairs of brackets may be identical to or different from; in the formula (11b), R^{17} is an alkyl group which may have a substituent and each of R^{14} , R^{15} and R^{16} is the same as above; u denotes an integer of 1 to 8; when u is 2 or more, each of groups in u pairs of
15 brackets may be identical to or different from; in the formula (11c), a ring Z^5 is an alicyclic carbon ring which may have a substituent; R^{18} is a hydrogen atom, a fluorine atom, an alkyl group or a fluoroalkyl group and R^{19} is a fluoroalkyl group; each of R^{14} , R^{15} and R^{16} is the same as above; f denotes an integer
20 of 1 to 6; in the formula (11d), a ring Z^6 is an alicyclic carbon ring which may have a substituent; R^{20} is a hydrogen atom, a fluorine atom, an alkyl group or a fluoroalkyl group; each of R^{14} , R^{15} and R^{16} is the same as above; g denotes 3 or 4; provided that compounds represented by the formulae (1a) and (1b) are
25 excepted for;

is contained.

11. A polymeric compound according to any one of claims 7, 9 and 10, wherein a repeated unit corresponding to a cyclic unsaturated monomer represented by the following formula (12a)

5 or (12b);



wherein each of Y9 and Y10 is an alkylene group, an oxygen atom, a sulfur atom or a non-bonding; Y11 is an oxygen atom or a -NH-group; f denotes an integer of 0 to 3; an atom constituting
10 a ring of the formulae may have a substituent.

12. A photoresist resin composition, comprising at least the polymeric compound as claimed in any one of claims 7 to 11 and a photo acid generator.

13. A process of producing a semiconductor, comprising
15 the steps of applying the photoresist resin composition as claimed in claim 12 onto a base or substrate to form a resist film, exposing, developing and thereby produce a pattern.